

Distraction Osteogenesis

Any other
logos you
need to
include?
NSF?
Or???



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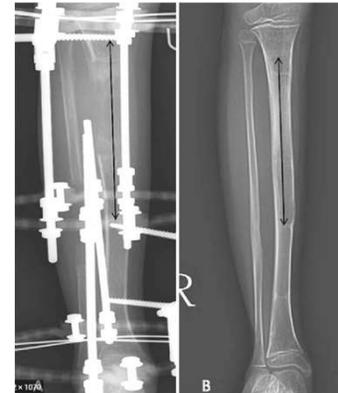
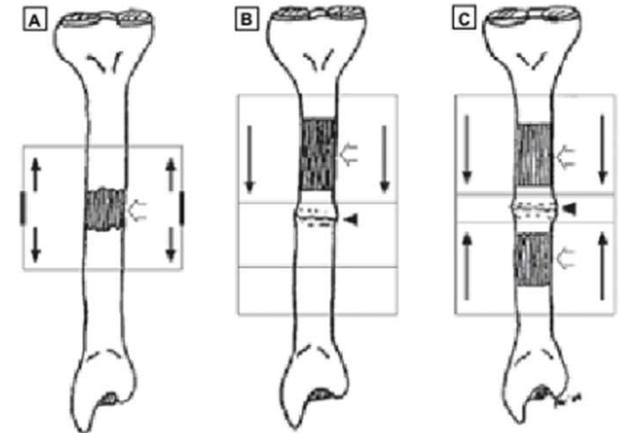
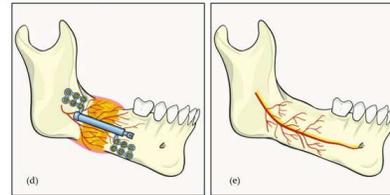
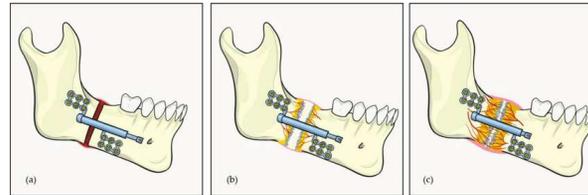
Background

Bone regrowth is vital

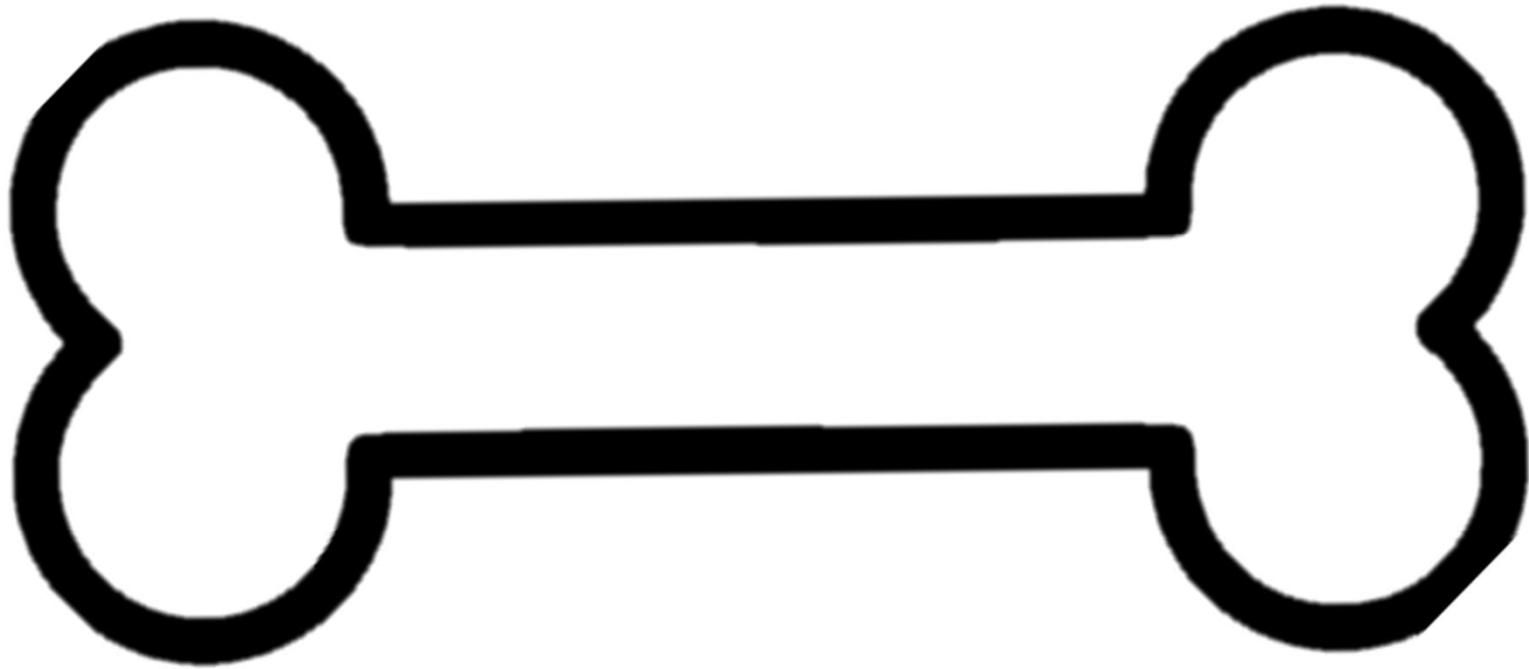
- Large (>5cm) fractures
- Improper growth

Distraction osteogenesis is a well-established method (see pictures)

Despite it being a vital process that changes the lives of many, methods for distraction osteogenesis have low efficacy rates to this day.



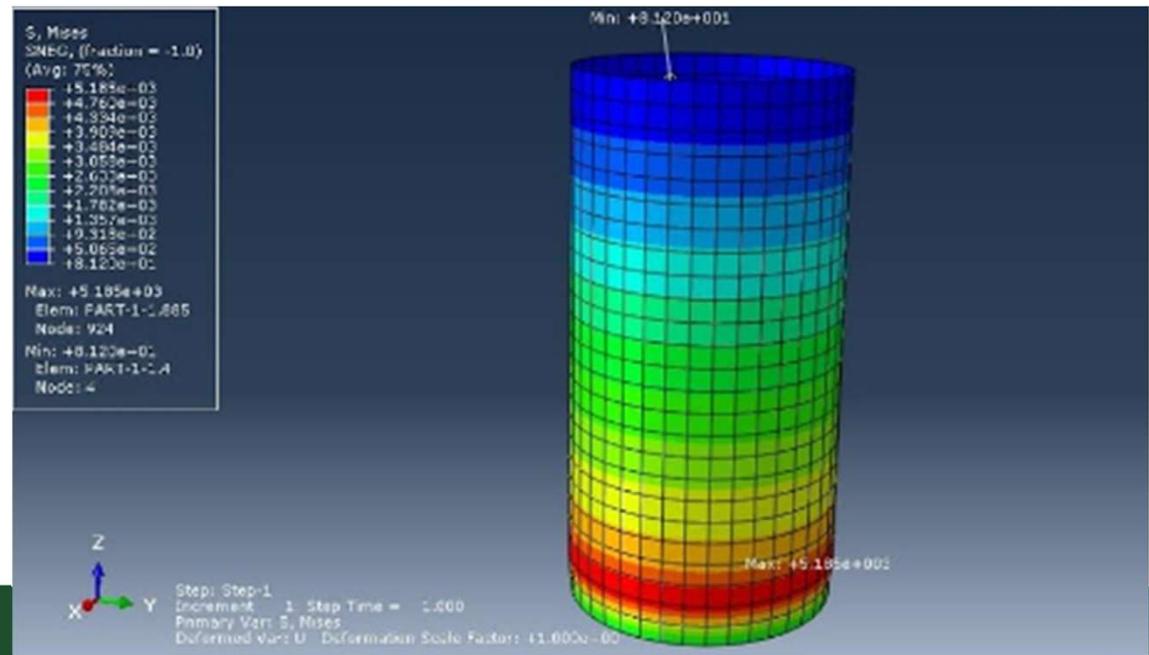
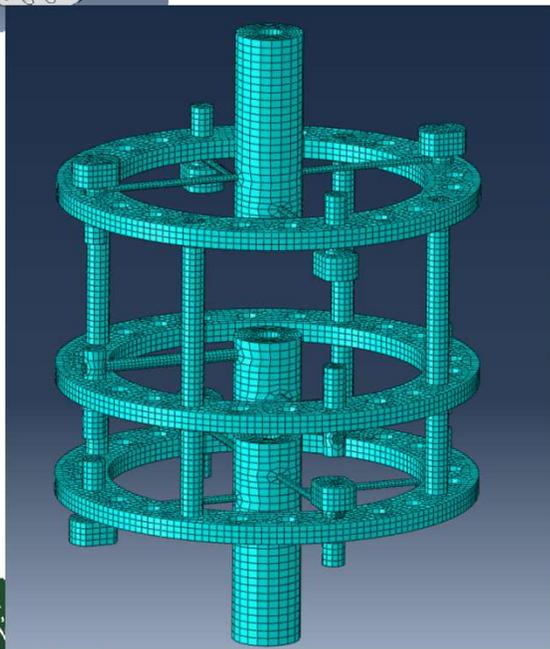
Introduction



Abaqus Methods

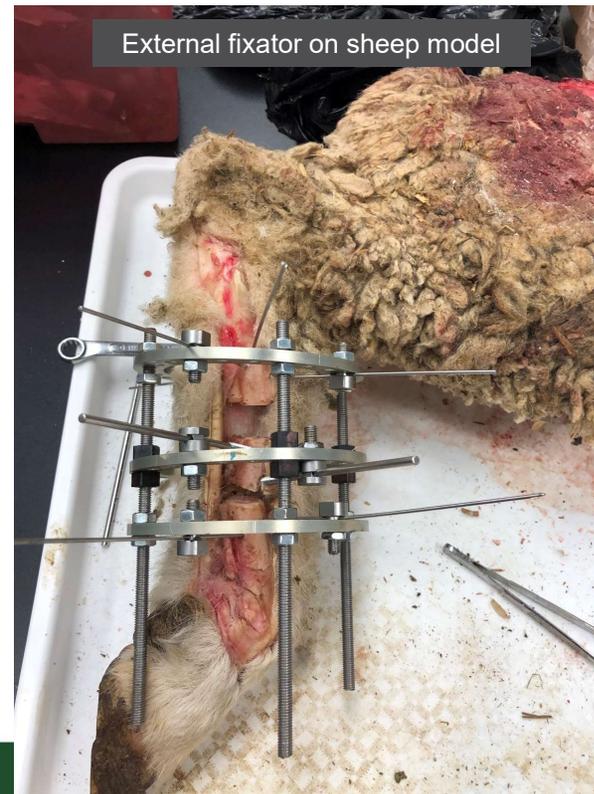


1. We designed parts on the program Abaqus.
2. We put together the parts into an assembly.
3. Once the model was designed, we could test how it would react to a sheep's weight.



Experimental Setup

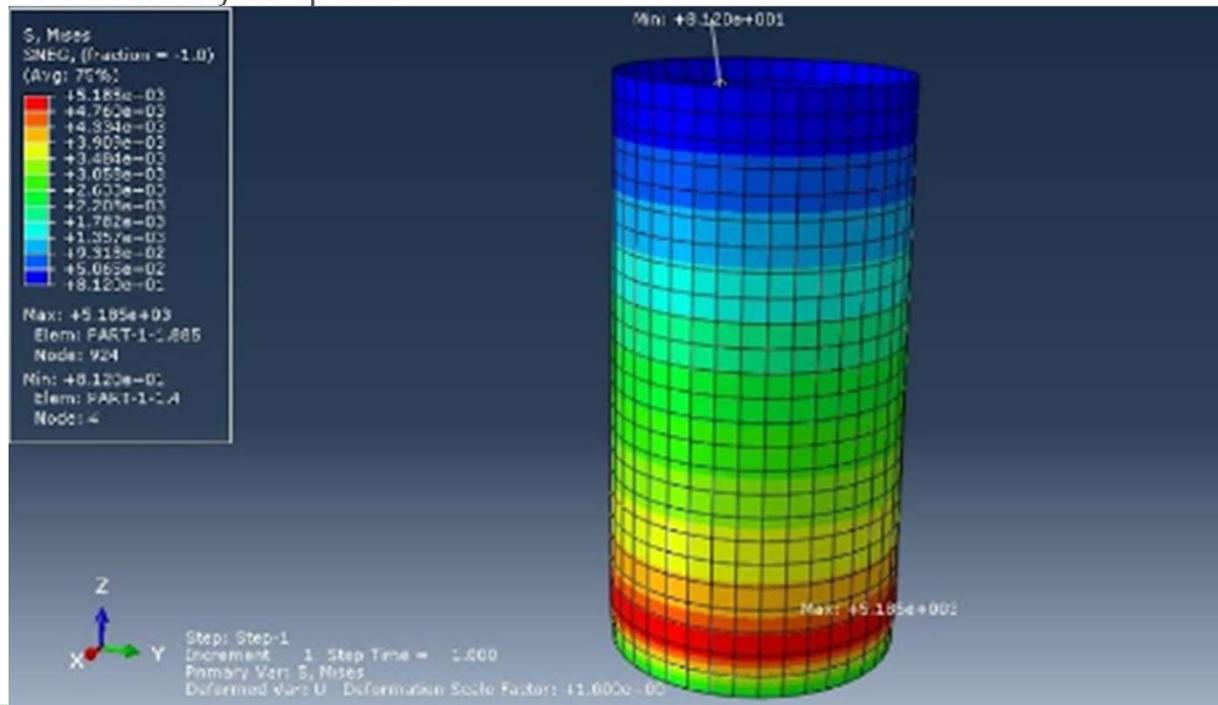
4. We found the right orientation for the design using a 3-D printed model.
5. We tried the model on a sheep cadaver.



Results

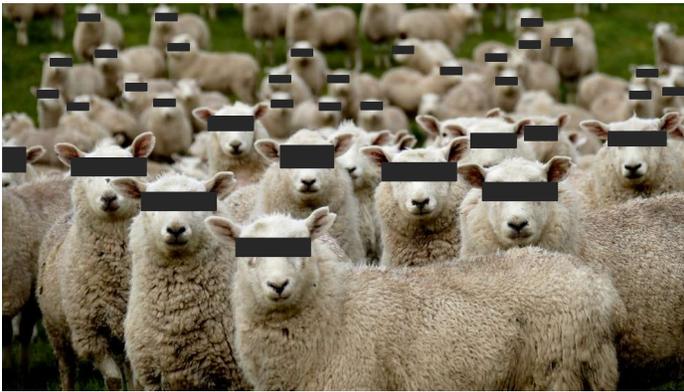
Until the external fixator is tried on a live animal, we cannot be certain of its efficacy.

Our Abaqus experiment will hopefully deliver positive results regarding the support ability of the external fixation when we have the assembly completed.



Discussion/Next Steps

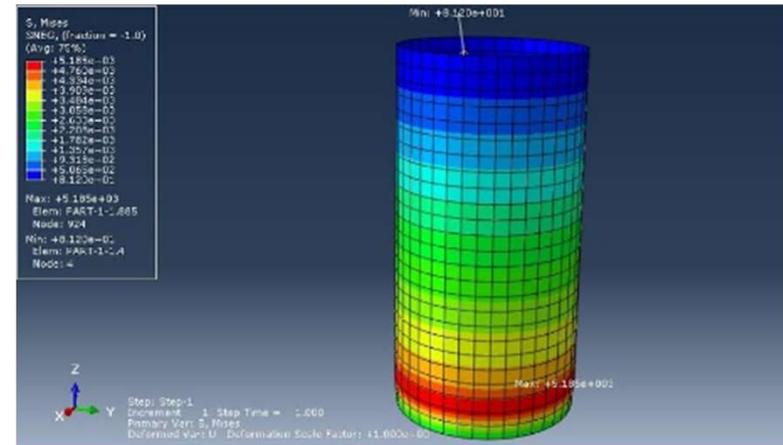
1. The next step will be to complete the Abaqus model.
2. Assuming all goes well, the next step is to try this design on 5 sheep to test its efficacy.



3. We will be submitting a proposal to the Department of Defense for a grant.
4. Also, we are hoping to begin to model the growth using python coding in Abaqus. This modeling of growth has a vast number of applications.

Conclusions

We cannot draw too many conclusions from this experiment since most of the work involved setup. However, once the Abaqus models are completed, we can use those models to point towards the idea that the frame of our design can support the sheep's weight. Therefore, by the end of this semester, we will conclude if our design is safe.



What benefits did you get from you SURE experience?

I really enjoyed becoming part of a team working towards a similar goal.

I received a true representation of engineering work, so I better know what lies before me in engineering.

I feel better equipped to go into circumstances where I am not fully comfortable with the material.

I feel as though, at least in a small part, I contributed to making the world a better place through reducing someone's suffering.

References & Acknowledgements



Faculty advisor: Dr. Ben Gadomski.

Graduate mentor: Michael Poland.

Lab mates: Chloe Brekhus and Erin Estrada



Collaborators: Stanford University with Dr. Peter Yang and Dr. Jeff Yueng.

Thank you to the Suzanne and Walter Scott Foundation, Tointon Family Foundation, The Filsinger Family, Caterpillar Inc., and Contributors to the Dean's Innovation fund for making the SURE program possible.



Thank you



Colorado State University